Fun Learning Tools to Enhance Students Interest in Science via e-Book

By

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ABSTRACT

The paper discusses on the impact of e-Book technology on the books market, status of e-Book usage in basic education and where to improve e-book technology in order to help teachers to expand beyond linear, text-based learning, to engage students who learn best in other ways and to enhance students' interest in learning. Its role in schools has evolved from a contained "computer class" into a versatile learning tool that could change how we demonstrate concepts, assign projects and assess progress. There are two types of data collection being done in this research; qualitative and quantitative survey. From the result of the survey done on Terengganu's students which were already familiar with e-Book, 82% agreed that e-Book allow them to have fun while learning in class. In future, it is being hope that the e-Book technology can be widely used in education, not just for an additional tools in class.

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INTRODUCTION

1.1 Project Background

A Chinese proverb says: “Do not confine your children to your own learning, for they were born in another time” while Jean Piaget, a Swiss developmental psychologist said: “The principal of education is to create men and woman who are capable of doing new things, not simply repeating what other generations have done”. To strengthen the power of education as the main platform in generating vast population of well-rounded Y generation, school class plays an important role as the place where the “business” of formal education actually takes place. It can be treated as an agency of socialization whereby individual personalities are trained to be motivationally and technically adequate to the performance of adult roles.

Nowadays, technology becomes an important element to survive in today’s world. Taking a comprehensive approach to technology education will ensure that children thrive in the modern education system and in the jobs of the future. However, most of us didn’t have today’s technology options when we were in school, so while parents realize technology has become an integral part of their child’s education, they’re sometimes finding it difficult to incorporate it into the learning process. Recent developments in mobile technology result in expanding the educational facilities by providing programs and services anywhere and at any time. Mobile education based on palmtop devices has gained general attention and various application models of it have been developed.

In Malaysia, mobile learning has started to be known and accepted by Malaysians. Mobile learning began to be used and applied at the higher education centers in Malaysia, such as Open University Malaysia, University Sains Malaysia, Universiti Technology MARA, and others. Almost every learner in higher education can be seen to have a mobile phone. But, why the implementation of mobile education not covers from the lower education? Is it impossible to build a learning environment with the aid of IT in the classroom?

Thus, to promote wide access to the Internet and connectivity in order to facilitate e-learning starting from the basic education level, the Ministry of Education has formulated policy for ICT in education, which emphasizes the role and function of ICT in education as a teaching and learning tool, as part of a subject and as a subject by itself in order to make lessons more interesting, relevant and meaningful, bring the world into the classroom and improve information literacy. Regard to this, an Fun-digital-learning aid being developed based on Year 6 textbook aiming to provide a more interesting, attractive and attention-grabbing learning environment for both teachers and students. This e-Book is expected to become an additional material for the textbooks and will assist the students understand the subject better by offering eye-catching user interface, animations and also allow them to check their understanding via exercises provided. This is merely an example of how we can benefit from the current technologies starting from basic education level.

1.2 Problem Statement

Technology of wireless and mobile networks is getting popular nowadays and it is rapidly becoming a new standard for every citizen to have one stable connection in their home, office, and even during vacation. Unfortunately, current education is still in lower level in term of utilizing the advantages of implementing mobile technology in learning process. A dull, uninteresting and unattractive learning process is one of the main reasons why students are unable to pay their attention in class, thus incapable to fully understand the topic being taught.

A Textbook is only as good as the teacher who uses it. It is actually just a tool, perhaps a very important tool in learning process. But, sometimes teachers are over relying on the textbook without considering any other materials or other aids in teaching. If teachers are only using the textbook as the main sole source for the information, it will narrow down students' perspective on a concept or issue and it is not fun at all. On the other hand, textbook failed in providing the current and up to date information to the students as it is impossible to produce new textbook for every year.

Besides that, solely using textbook as the in learning will lead students to assume that learning is simply a collection of facts and figures also just as an accumulation of correct answers and textbook itself being provided with lengthy wordings are usually unable to maintain the students' interest.

1.3 Objectives

- To survey the effectiveness of existing e-Books in Malaysia for Year 6 students in primary school.
- To design a system with interface, based on a topic in Science subject that satisfy students' needs and requirements.
- To develop an interactive-digital-learning aid based on a Science topic students in order to promote a more exciting and memorable learning experience.

1.4 Scope of studies

This project aimed to propose early implementation of mobile learning tools as to nurture early exposition about technology for the young generation. Therefore, one mobile based learning application has been proposed **to be part of learning platform during the class**, called electronic book (e-Book). The main target audiences are the students aged 12 (standard 6) and Science teachers.

The scope of study is focusing on the development of **e-Book will provide all the information in different way from what already available in the textbooks** together with example that will help their understanding. It comes with more real and interactive of example as expected to give broad overview about Science they learnt in classroom. This e-Book is **aimed to be the complement of the textbooks**. **It will only cover on chapter 6: 'Eclipses'**. Student will be provided with videos and simple notes with animations which allow them to stay interact and maintain their interests throughout the learning session. Once they finished the lesson, students have to answers questions in order to check on their understanding. The more correct answer collected the more point that will be given. After that, e-Book will notify the marks of the students to the teachers and if they get lower than 70%, students have to repeat the exercises before they can continue to do other exercises.

Mobile based learning has been discovered many years before and this medium is believed to provide fun and attractive learning process. Since the project is using Android platform, the author need to do extensive research about the latest trend and behavior of users towards mobile and technology in different environment with regards to what technology can offer.

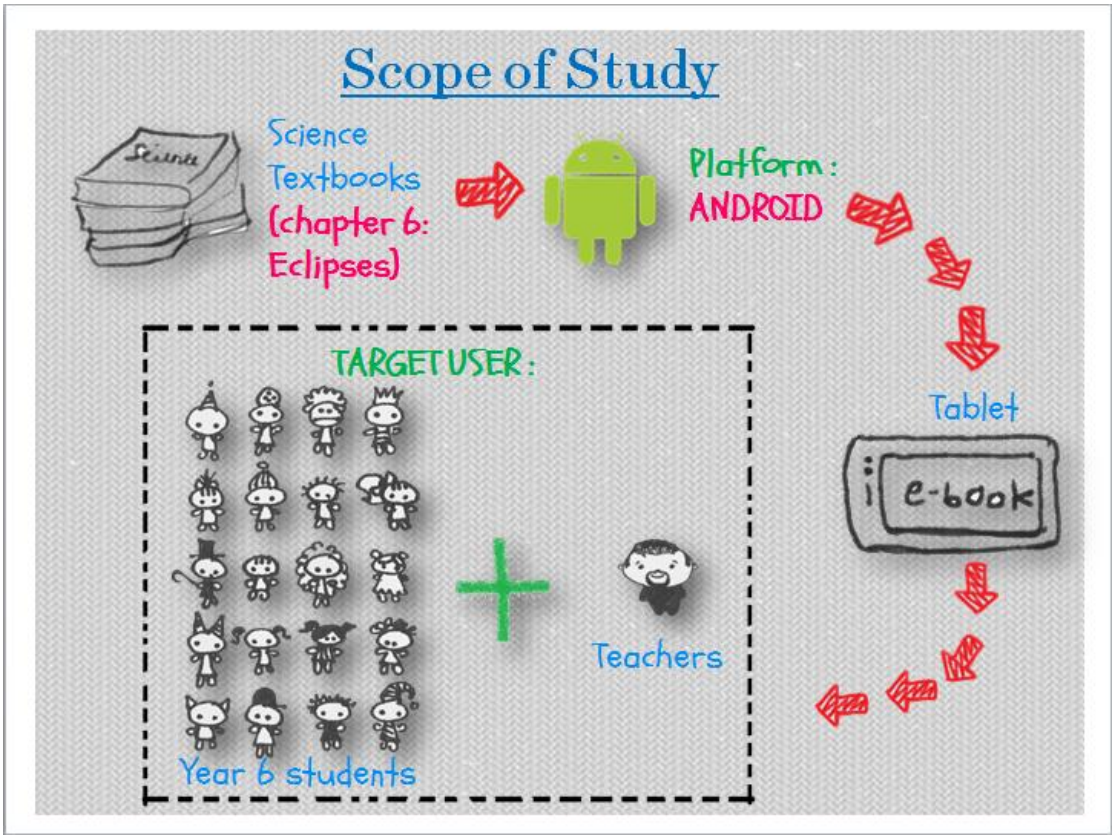


Figure 1.4: The Prototyping Methodology

LITERATURE REVIEW

'e-Book' is originated as an abbreviation for 'electronic book' which is application that are produced for distribution and subsequent reading on a computer or other electronic device, rather than being printed and bound as traditional books are (e.How.com). Previously majority of e-Book that has been distributed in the market are in PDF format, meaning they can be read on any computer or other electronic devices that can read PDF files. Thus, reading process via 'e-Book' consists of opening the file on electronic devices and reading the text on the screen. Some of 'e-Book' stimulates the page turning application.

Realizing facts, the limitation access to the internet creates serious effects on the education; many efforts being done by the government and also non-government society in bridging the digital divide in education. For instance, to reach new audiences and extend the benefits of digital technology to previously unreachable populations, Intel® Innovation Centre is developing an array of information and communications technology (ICT) strategies as well as e-Learning programs using wireless technologies. Narrowing the digital divide in education can begin with expanding access to ICT using new wireless technologies. However, realizing the full promise of e-Learning also requires understanding our audiences and building tools that meet their needs (Gerard Smith, 2006). Therefore, mobile learning implementation like 'e-Book' in basic education provides alternative channels for improving the quality of education.

In diversity of reading and the usage, readings through 'e-Book' application not much differ from the reading through printed books. Nevertheless, 'e-Book' usage in the classroom is the best application of technology. No matter what the platform used to read the e-Book either handheld, laptop, desktop, GRAPHING calculator, cell phone or MP3 player, this application is already around us now and we need to make the best of this technology (Cavanaugh, 2006).

The first 'e-Book' was created when people began to use the electronic form of resources such as word processing to create and store information, electronic book or e-

Book is a portable computer tools designed to facilitate the storage and display of reading material. E-Book provides a variety of features that make it suitable for the job which is actually a lightweight design, easy to use, capable of storing a lot of material and have high quality backlit screen for reading comfort in every lighting situation.

According to Nelson (2008), e-book is an electronic book that can be read digitally on a computer screen, particular e-Book readers, personal digital assistant (PDA) or cell phones and in other words, the e-Book being used on the screen rather than on paper. E-Book has its own advantages over the printed book. Among the advantages are, e-Book can remove bookmarks or bookmark, which allows the user directly to a bookmarked page when you open the book. In addition, it is possible to create the same e-Book contents of a printed book using the scanner as well as a PDF copy. Just like printed books, e-Books also contain pictures or charts, index and contents (Nelson, 2008).

In Malaysia, the use of e-books among students is not broad but starting in 2009, the state government of Terengganu has begun to apply the e-book in primary school pupils. Beginning in May 2009, the state government has distributed 23,000 of computer units gradually. The use of netbook computers serve as a tool for e-Book reading where the government is also looking at the e-Book in schools as an alternative to overcome the problems faced heavy school bags of students (Bernama, 2009). Sower (2008) argues, in the man proud of the technology available now, why do students still have to carry heavy textbooks while handheld devices can provide the same information? Tools reader or e-book platform will be able to read various e-book formats like html / xml, text, Adobe Acrobat Reader, Microsoft Reader and Palm Reader using Windows or Macintosh platform (Cavanaugh, 2008). With the advent of e-Book reading device with the appropriate format, the method of reading the students will be enhanced.

According to Cavanaugh (2008), to help students read fluently, educators need to prepare and monitor oral reading and to achieve this, educators need to help students in improving training through available technology and e-Book is the application of the best seen. The famous educator Professor Yan Lee said: “Education is a profession which perfects the educators and the educated and it will be more conducive to the

improvement and development of the student only when the educators consciously improve themselves". With the rapid development wireless mobile communicational technology and the increasing popularity of mobile terminals, mobile learning has slowly becomes a new way of continuing education for teachers. "We firmly believe that if teachers don't enhance the quality of life, it is difficult to achieve high quality of education. If the spirit of teachers don't be liberated, it is difficult to achieve the liberation of the spirit of the students. If teachers don't take initiative development, it is difficult to achieve creative spirit of the students (Ye Lan, 2002)".

From the 70 teachers' questionnaires survey, combined with the interview session of 10 teachers separately done by Zhu Jingdong from Department of Educational Science and Technology, Zhejiang University of Technology, shows that under 'Limited in teaching resources and inadequate in sharing', only 30% teachers will learn good, advanced education and teaching methods through CD, VCD,DVD and other visual tools. This teaching model can't meet the urgent need to update knowledge of modern education and the sharing information resources cannot be guaranteed (Zhu Jingdong, 2009). Hence, mobile learning is a new approach to learning. E-Book provides wireless mobility, portability and efficient, extensive, interactive, sharing medium for education is important in order to help the educators in building the best teaching methods (Zhu Jingdong, 2009).

In building new 'e-Book', we try our best in finding the factors that will increase the effectiveness of using this application in basic learning process of primary students (standard 6). To compare with the current 'e-Book' existed in market, new approach through augmented reality is used which is more interactive and fun that enable students to 'play and learn'. Besides, this 'e-Book' also comes with exercises for the students to test their understanding. Once they finish with their exercises, marking process will be available to check whether the answers are correct or wrong. On the other hand, another latest approach that will be implemented in the new 'e-Book' is 'Question Bank' whereby they can search for previous exam question for UPSR (Ujian Pencapaian Sekolah Rendah). Learners today must be able to not only memorize facts and

information, but must also be able to locate information and create appropriate solutions (J. Bransford, 2000). Technology can, therefore, become a tool for the access, exchange, and creation of appropriate information (C. Staudt, 2005). Ultimately, this 'e-Book' must be easy to use, flexible, reduce than increase cognitive load.

Mobile learning, however, is constrained by mobile device characteristics as much as it is enabled by them. Ultimately, the degree of constraint or comfort is dependent upon the hardware and software configurations. It is also dependent upon adjustments in teaching and learning strategies. The limitations are including physical limitation like screen sizes, awkward input methods, limited output capabilities, weak processing power, limited memory, difficulty navigating, and difficulty scanning through text (C. Shepherd, 2009). Waycott and Kukulska-Hulme found that, regardless of how pleased students were with PDAs, they still preferred to use a laptop because of the greater processing power, screen size, and available functions. The students indicated that PDAs were useful, but as "another resource amongst many" (J. Waycott & A. Kukulska-Hulme, 2003).The results from Koole's study support the view that mobile, wireless handhelds will remain complementary to the larger desktop and laptop computers.

Discussing about cognitive load, mobile learning application should not add cognitive load. The learners commented that they felt disoriented reading electronic documents on PDAs (J. Waycott & A. Kukulska-Hulme, 2003). The students felt that they had a better sense of context from paper documents; that is, they could more easily determine the length of a document and their progress through the paper documents given the associated visual and tactile cues. Some learners may suffer from reduced psychological comfort and may find themselves spending unnecessary time trying to become better oriented with reading materials delivered on mobile devices. Again, this is a sign of opaque technology. There are ways of increasing transparency. One way is to reduce the number of actions required to complete a task (B. Shneiderman & C. Plaisant, 2005). Long and detailed set-up procedures cause the user to shift his or her focus to the device rather than the learning tasks. Another way to increase transparency and decrease cognitive load is through the automation of procedures that make common functions

easier and more efficient. For example, some PDA software will attempt to complete words based on the first few characters that the user selects. This process can help to speed up data input because the user need not type complete words. In addition, if a device can perform repetitive and mundane tasks more accurately and quickly than the user, the user will be able to concentrate on higher level tasks (R. Marra, 1996). For example, some word processor applications will correct simple typing errors as they occur. This releases the writer to concentrate on the content or more demanding aspects of writing such as grammatical, structural, and stylistic issues. These techniques may be particularly important when learners are using mobile devices with limited input capabilities.

Another serious issue that is often heard now is abusing the ‘e-Book’ usage which is getting widespread among the students. Monitoring the use of e-books among the students also needs to be done and this is the responsibility of teachers and parents in educating and shaping the students in handling tools they receive. Abuse usage of e-Book will impact students learning this and their personal behavior that will lead more serious problem.

2.1 Challenges and opportunities in the realization of mobile learning via mobile devices in Malaysia

The effort in employing mobile devices in learning and teaching process is not an easy task. Several challenges have to face because changing traditional education platform involved changing of learning and teaching methods as well as changing individual's perspective. Malaysian is cultural, political and economic in nature. Like in education worldwide, stakeholders in schools in Malaysia, especially teachers, perceive mobile phones as distractions. Mobile phones are believed to cause various discipline issues among the students (Kosmo, 2009). In Malaysia, the pioneer of the mobile technology deployment at school is e-Book project, which is based in the State of Terengganu, located in the east of Peninsular Malaysia (Kosmo, 2009).

Year 2009 had brought different approach in Terengganu's primary education. Chief Minister of Terengganu, Dato 'Ahmad Said has initialize the idea of e-Book in primary schools as one of steps in building perfect and up to date learning environment to cope with the advancement technology. "As a first step, the State Government provided 25,000 units of e-Book: mini laptop equipped with a variety of software textbooks for primary schools and additional software including the Qur'an, the prayers and prayer practices that can be used by all students in Year Five", he said after launching the e-Book at Universiti Malaysia Terengganu (UMT) end of May 2009.

Nevertheless, the employment of the e-Book is not without issues. Since the e-Book is using mini laptop as the medium in learning, the issues on misuse of the technology have arisen. Via the mini laptop, once it has been connected to the internet the student be able to download indecent material to their e-books and accessing malicious content from e-Book, "Bahan lucah dalam e-book - Pornography material in e-book" , (Kosmo, 2009). But to confront with the issues, a bespoke software are being used to monitor students' e-books, "RM30 juta tapis e-Book, pantau kelas - RM30 million filter e-Book, monitor class", (Kosmo, 2009). Moreover, special technical personnel known as Executive Information Officer (EIO) are being provided at every school to maintain and

manage devices as well as to monitor students' usage of the devices in the implementation (TESDEC, 2010).

Besides that, the political issues in mainstream schooling of Malaysia also become one of tough challenges to be overcome. Mobile phones have contributed a lot of social problems toward the students for example theft issues, fighting among students, spreading malicious message among students and distracting students from their lessons. Due to that, Ministry of Education Malaysia came out with a circulation which prohibits the mobile phone usage in every school in Malaysia (Circulation Letter Number 2/2009). The reasons are parallel to numerous opinion that mobile phones is being regarded as a disruptive technology at schools (Rosile, 2007; Technology Education, 2006; Bauer & Ulrich, 2002; Clyde, 2004; Tatar et al, 2003).

Thus, to compensate the existing policy at schools in the effort to introduce mobile phones as learning medium, step by step approach should be taken. Kolb (2008, pp 12) suggested that students using the mobile phones outside school hours, for example for the use of field trips and homework assignments so students do not have to bring the device to school to eliminate some school-based negative consequences as well as not violating current policies in many schools. It is no doubt that mobile phones also bring positive impacts in learning process and by considering formulating procedures in the mobile phone usage in schools can be a guidelines towards the implementation. Valentine (2004) suggested, there is a lack of policy and procedure for mobile learning implementation because the field is relatively new and more research into this area is needed. In order to cater the local situation at schools towards the deployment of mobile learning, Malaysia should develop its own implementation strategy.

All of us realize that the percentage of mobile phones users keep on increasing day by day. From the survey conducted by Malaysian Communication and Multimedia Commissions on the Mobile Phone Users Survey 2007 showed that in 2008 among 100 Malaysians, there are 90.6 mobile phones (Malaysian Communications and Multimedia Commission, 2007). Meanwhile, based on the study conducted by Open University Malaysia, which stated that 90% of the population in Malaysia has mobile phones and

they believed that it is a sensible choice to use mobile phones for mobile learning (Yusoff et al, 2008). To add on, findings from studies conducted by Universiti Technical Malaysia and Multimedia University Malaysia also suggest that university students have positive attitude towards mobile learning via mobile phones (Hashim et al, 2008; Hassan & Sethuramagalingam, 2004). At school level, students also showed positive attitude towards mobile learning (Mohamad, 2007; Mahadi, 2005).

With the high acceptance of mobile phone usage among Malaysian community pack together with the positive attitudes towards the mobile learning, it shows a positive sign that Malaysian citizen has the potential to implement mobile learning in educational system. Yet, social and political aspects are important to be confronted before deployment of mobile phones in teaching and learning to make sure that the negative issues will not arise again and again.

METHODOLOGY

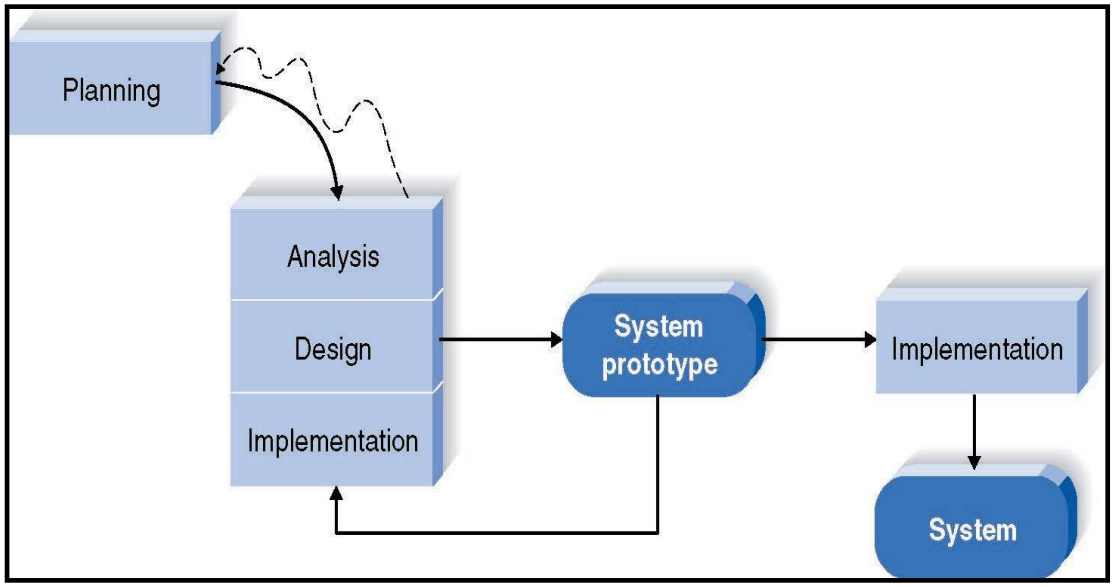


Figure 3.1.The Prototyping Methodology

The research methodology for this project will focuses on reviews of books, journals, internet resources, newspaper, t-test, questionnaire and other resources that is useful in developing this project. The chosen model to be implemented is prototype model which the analysis, design, and implementation which will be conducted concurrently until the completion. Bowman (2009) state that, this model is useful as it lets the author to ponder a new solution to fix any problems and difficulties to make a few refinements before developing the final result. The process is involves of four stages which are planning, analysis, design and implementation.

3.1.1 Planning

For planning stage, the author is putting a few problem statements on developing this project and thinks the reasons why this project should be implemented in order to solve the problem stated. Then, data gathering process and research, to look for information in regards to the project title. Several approach being done to collect for data:

i. Research on existing products

ii. Online survey

iii. Phone interview

iv. Study on related journal, websites

The planning activities from this stage used as the baseline to monitor the project progress by stages. To ensure that tasks involves are correctly assigned, a Gantt chart (see Appendix) and key milestones developed to make sure enough time is allocated for specific task and completed the project according to the time projected.

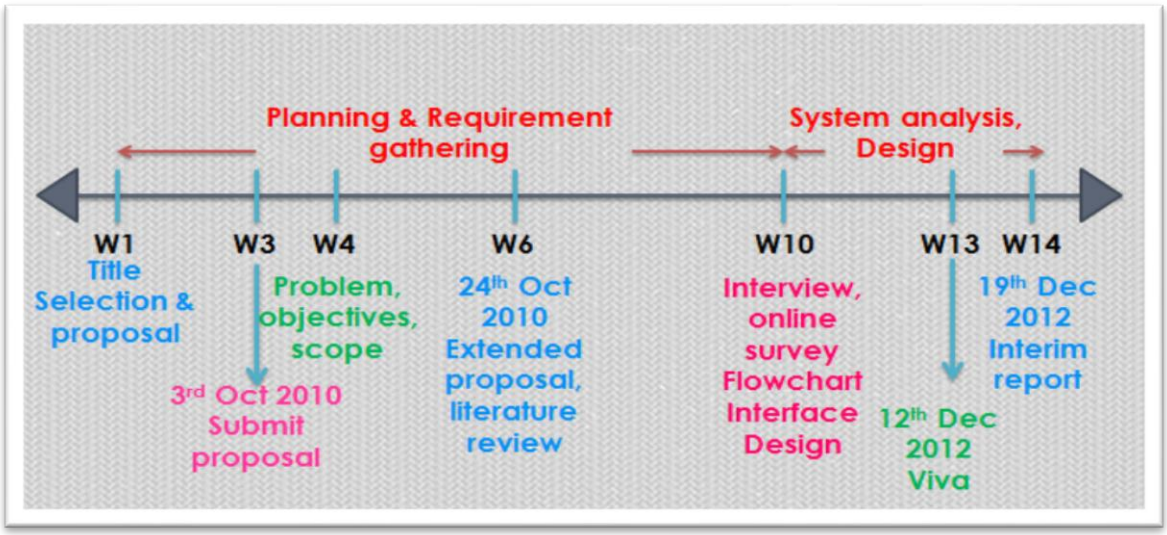


Figure 3.2: The Key Milestones of Final Year Project I (Sept 2012-Dec 2012)

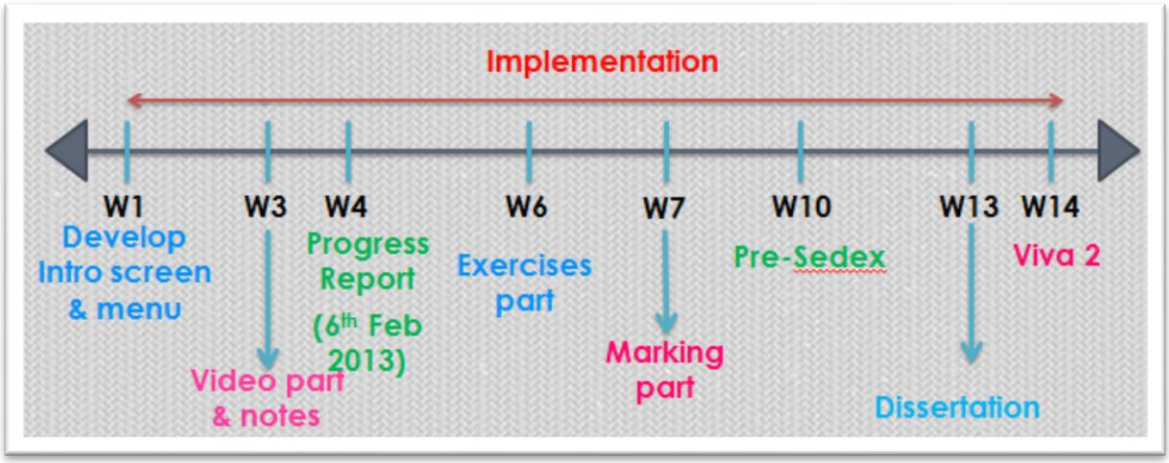


Figure 3.2: The Key Milestones of Final Year Project II (Jan 2013-May 2013)

3.1.2 Analysis

The purpose of data analysis is to find the solution for all the problem statement of the project. Research is the most crucial in this stage in order to analyze the learning requirements for students. Journals, web-site articles, newspapers and books are widely used to find out the solution and strengthen the knowledge about the subject of research. All the related works has been gathered and reviewed in literature review part which aimed to get the importance and benefits of this project.

3.1.3 Design

This is the stage where the real system or software will be developing. Thus, the author needs to do research on mobile apps development. Android OS smartphone will be used to test the system. The tools such as MIT Apps Inventor and Android SDK are important to write the java code to develop the project. Realizing the importance of graphical user interface, GUI towards the application, the author makes another focuses on interesting user interface for the game to develop. This is to capture the end user interest to use it.

i. Activity Diagram - used to model a large activity's sequential work flow by focusing on action sequences and respective action initiating conditions. The state of an activity relates to the performance of each workflow step. Connected by the arrows, all the shapes are representing an activity diagram which is run from an activity start to completion and represent the sequential order of performed activities. Circles represent an initial workflow state which indicates an end state. Rounded rectangles represent performed actions, which are described by text inside each rectangle. A diamond shape is used to represent a decision, which is a key activity diagram concept. Upon activity completion, a transition (or set of sequential activities) must be selected from a set of alternative transitions for all use cases.

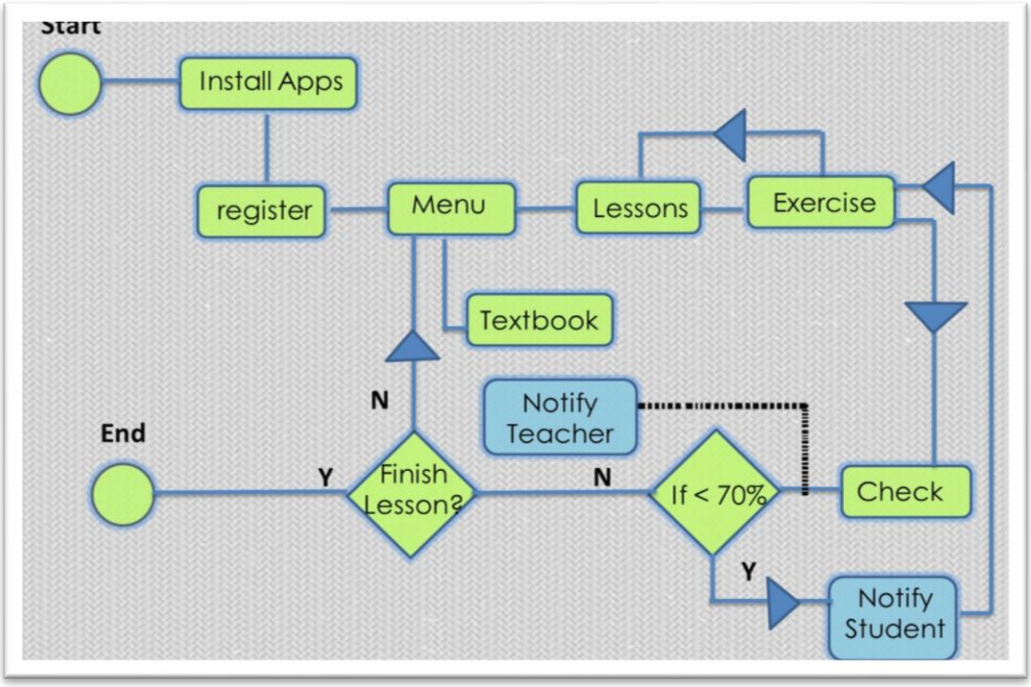


Figure 3.3: The Activity Diagram of Project

ii. Use-case diagram - UML Use Case Diagrams being used to describe the functionality of the e-Book system in a horizontal way by showing all of its available functionality. In this system there will be 4 major elements: The actors, teacher and students, that the system you are describing interacts with, the system itself, the use cases, or services (login, viewing chapters, notes, exercises, check results), that the system knows how to perform, and the lines that represent the relationships between all the elements.

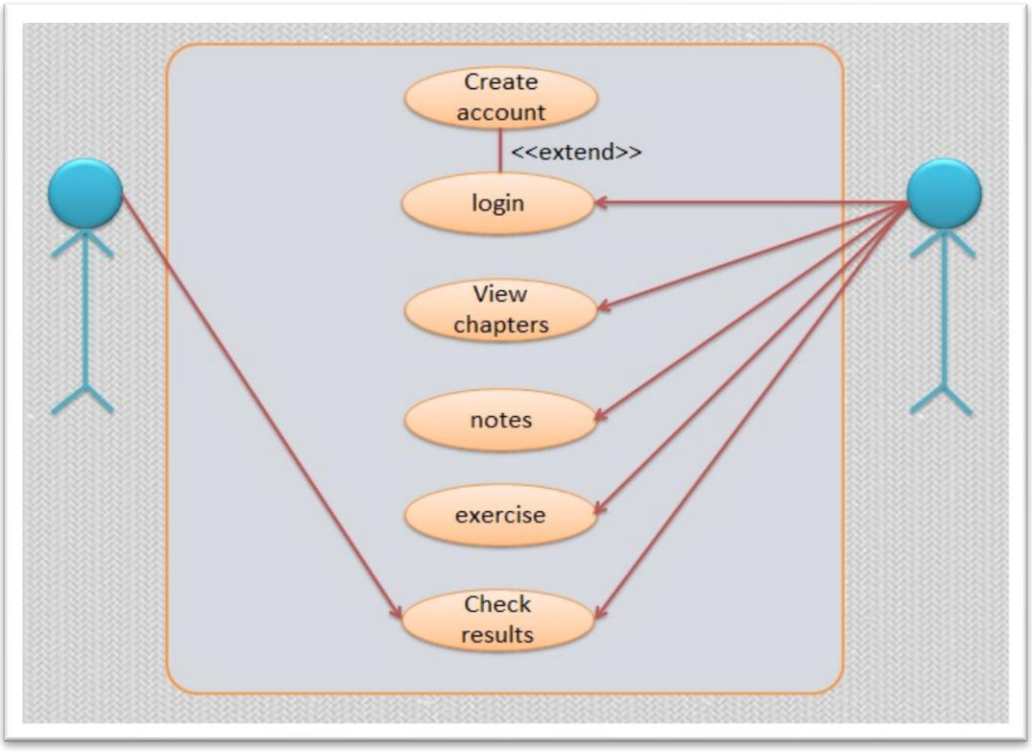


Figure 3.4: The Use-case Diagram of Project

Based on Figure 3.4, the students are able to perform 4 main services plus 1 extended service (create account function) from login function provided in the system while teachers only can check the student's result of the exercises. The function of sending marks' to the teachers can be run if there is internet connection connected to the tablet.

iii. Contact Diagram – A System Context Diagram (SCD) in software engineering and systems engineering is a diagram that represents the actors (teachers and students) outside a system that could interact with that e-Book system. This diagram is the highest level view of a system.

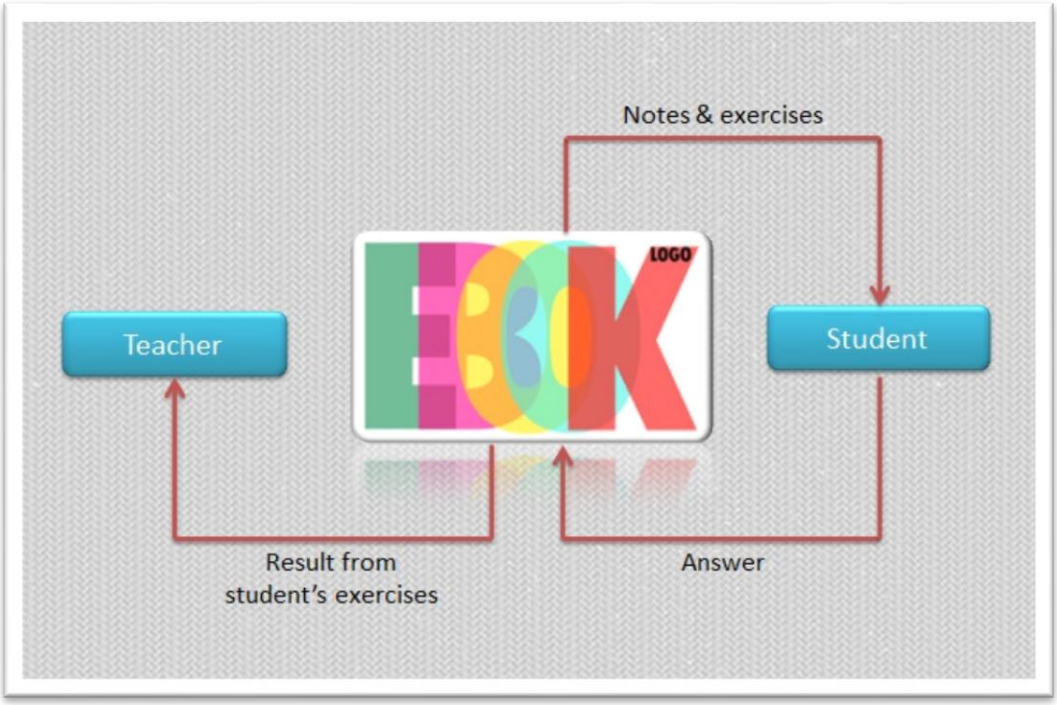


Figure 3.5: The Contact Diagram of Projectkn

iv. Database diagram – shows the data hold by the system. There will be 2 tables required in the database, first one is student's account and second is marks obtained by students for each chapters. There will be one chapters available in this e-Book, thus only one marks hold by each students.

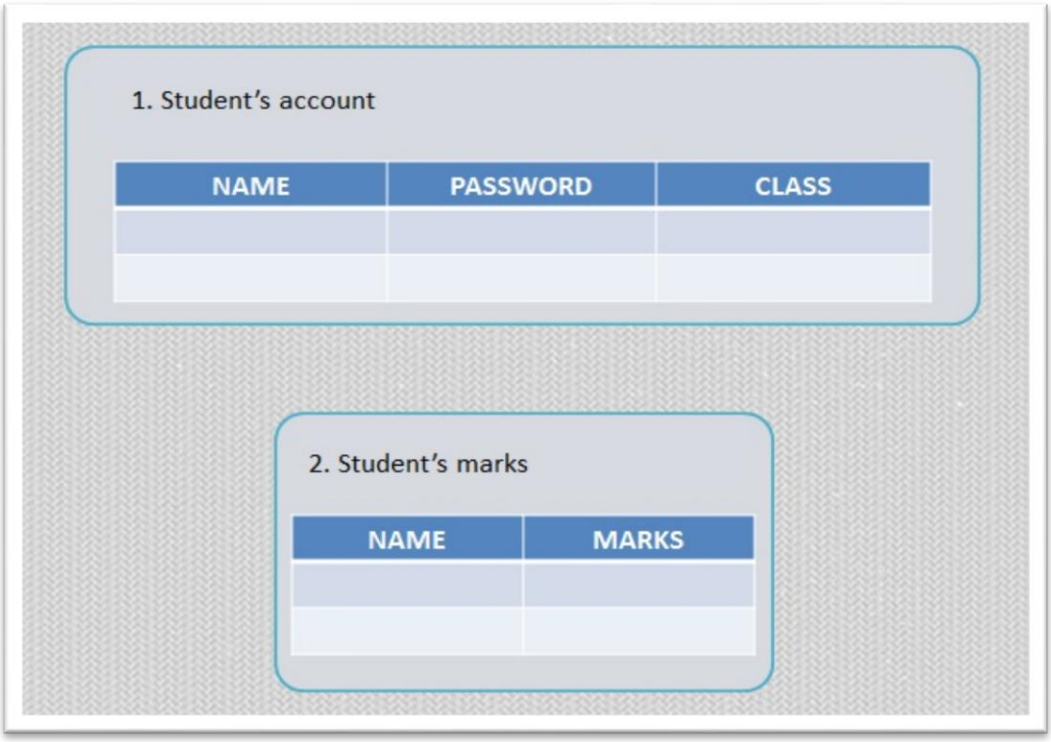


Figure 3.6: Database Diagram for the project

v. Interface design (see Result & Discussion) –The interface design include number of screens, which objects on which screen and the positions of the objects on the screen, definition of audio channels and input devices. It is also imperative to consider the functionality of object, the content of menu bars, and the specific controls (Mohamad. M, 2007).

3.1.4 Implementation

This stage is important to see the results and opinions from the user to see any bugs or problems from the system. All the comments from the user will be revised to develop a better system. The system will be finalized when the user is satisfied with all their requirements and needs.

3.2 Tools

i. **Hardware** – Debugging process during the application development requires a target machine connected to the development machine. The development machine is used to install and run Adobe Photoshop, Android SDK and **Eclipse Java** and other tools for the purpose of development only. Meanwhile, the target machine here is referring to an Android smart phone connected to the development machine using 30-pin micro-USB 2.0 cable.

Below are the specifications of the hardware used in the development of Stretch.

Development Machine Specification (CPU unit)

- Processor – Intel Pentium (2.00ghz)
- RAM – 3.00 GB of DDR2 (2 GHz + 1 GHz memory)
- Platform – Microsoft Windows 7 ultimate (32-bit)
- Browser – Google Chrome

Target Machine Specification (Galaxy Tab 7.0)

- CPU – 1.2GHz dual-core processor
- RAM – 1GB
- Platform – Android v2.3.5 (Gingerbread)
- Internet – 3G, GPRS, EDGE, Wi-Fi

ii. **Software** – Application/Android Development, Adobe Photoshop cs4,

JAVA ECLIPSE (Android Coding System)

Eclipse is a multi-language software development environment comprising workspace and an extensible plug-in system. It is written mostly in Java. It can be used to develop applications in Java and, by means of various plug-ins, other programming languages including Ada, C, C++, COBOL, Fortran, Haskell, Perl, PHP, Python, R, Ruby (including Ruby on Rails framework), Scala, Clojure, Groovy, and Scheme. (Wikipedia, 2012)

Adobe Photoshop CS4

Adobe Photoshop is a popular designing application that is used to create graphic designs and photo manipulation. In this system, it was used to design the interface as well as components such as characters and buttons.

RESULT AND DISCUSSION

4.1 Data Gathering & Collection

4.1.1Quantitative survey

An online survey was conducted for students of Terengganu who already familiar with e-Book. The research population included primary five and six students. The students from the schools were randomly chosen to answer a questionnaire which consisted of 12 questions. The questions addressed usage, emotions, lifespan and assistance towards using e-Book in the classroom. A total of 30 forms were distributed and the rate of response was 100%.

Out of 30 participants, 14 were males and 16 were females. The majority were 11 (13%) while the rest (87%) were 12 years old.

Survey: e-Book

Introduction:

E-Book - an electronic version of the book which is read using electronic devices such as laptop computers (laptops), tablets and smart phones (smartphones).

I was gathering feedback on the implementation of the e-Book for Year 6 students. E-Book is more interactive and fun version of textbook and accompanying together with exercises to test students' understanding. I am very grateful for your willingness to complete this brief survey to help me assess whether the e-Book is able to offer a better learning system and attractive to students in 6 or not.

1) Age

2) Sex
   - Male
   - Female

3) School

4) How often your teachers use e-Book in classroom?
   - Daily
   - Sometimes
   - Rarely

5) Where e-Book can be used?
   - Home
   - School
   - Anywhere

6) Do you be able to follow the lessons taught in classroom using e-Book?
   - Yes
   - No

7) Which one you prefer between paper book and e-Book?
   - Paper book
   - e-Book

8) Do you think e-Book is not boring?

- Yes
- No

9) Do you have problem using e-Book?
   - Yes
   - No

10) Do you agree e-Book lightened the weight of schoolbag?
   - Yes
   - No

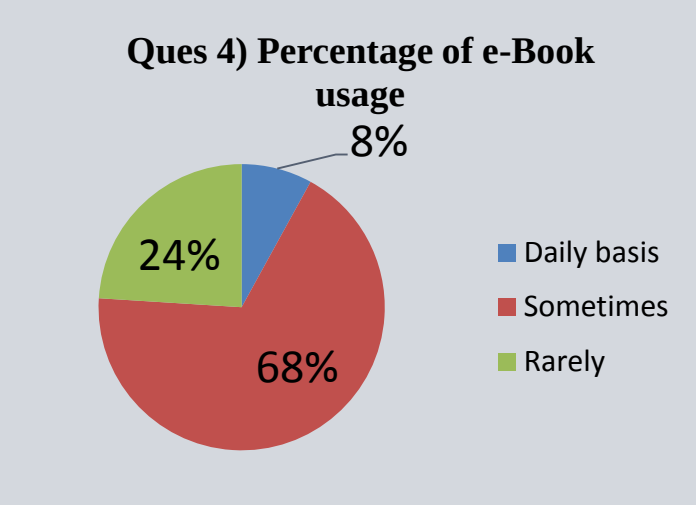
11) Do you have computer at home?
   - Yes
   - No

12) Please tick in the box

Do you familiar using …

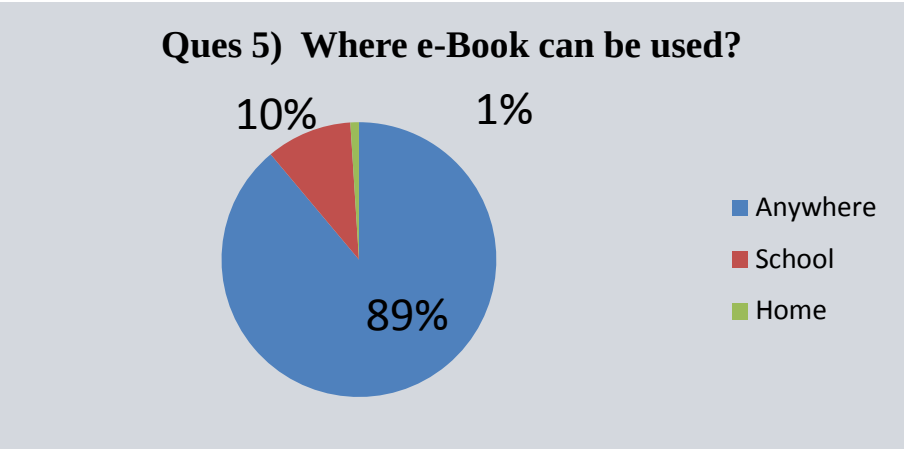
i. Desktop computer ☐
ii. Tablet ☐
iii. Smartphone ☐

Below are the results of the online survey. Out of 30 participants, 14 were males and 16 were females. The majority were 11 (75%) while the rest (25%) were 12 years of old.

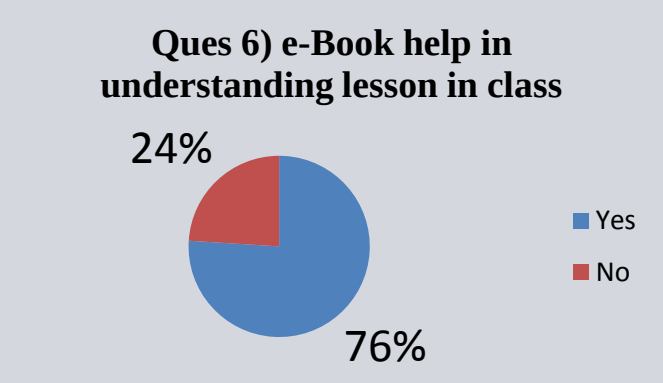


Teachers rarely use the e-Book in class which is 68% due to limitations on the e-Book itself:

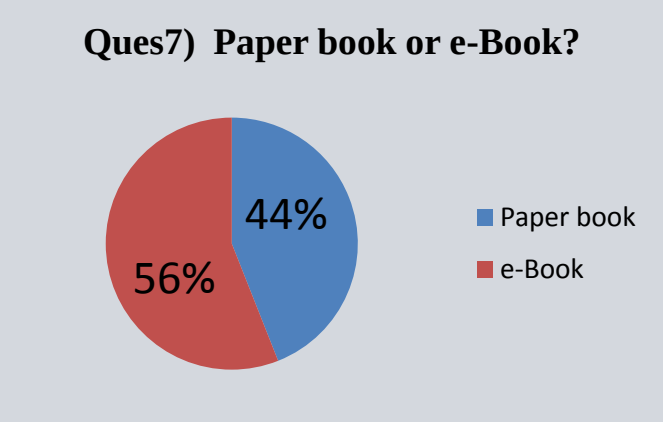
- Limited storage capacity on the hardware itself.
- Limited power outlets in a classroom that interrupt the use of e-books in classrooms.
- Teachers and educators may not be adequately trained to conduct lessons with e-books.
- Some may find e-books do not offer the same pleasure of reading as compared to reading paper books.
- Some e-book readers discourage text annotation. Students cannot write in texts, underline, circle, or even comment in the margins to help them understand and analyse information.
- Stringent DRM (Digital Rights Management) often prevents e-books from being shifted from one device to another.



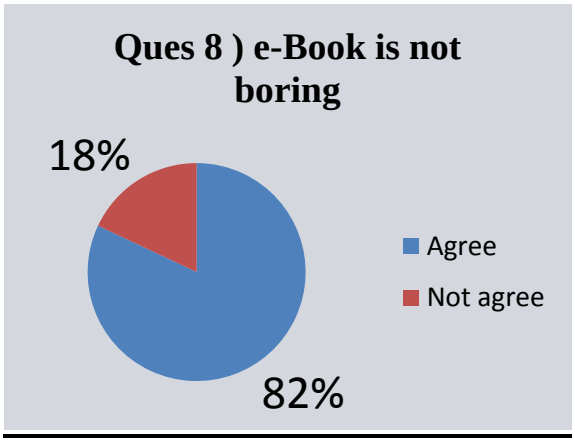
Many of the students find that e-Book can be used anywhere because it is easy to be carried everywhere they go



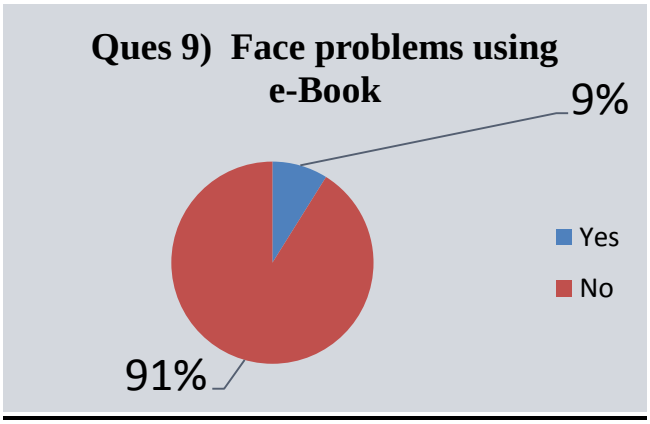
Students also find e-Book help them to understand each chapter they learn more rather than paper book.



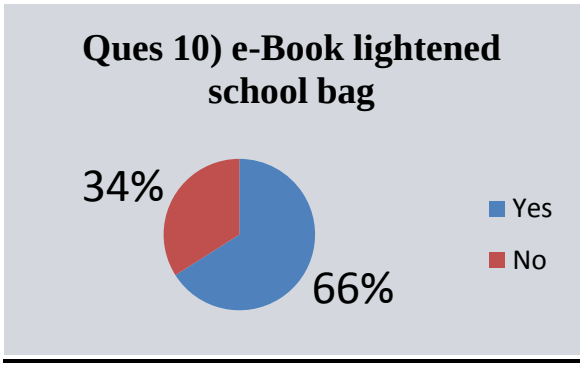
Quite high percentage (58%) of the students prefers e-Book rather than paper book.

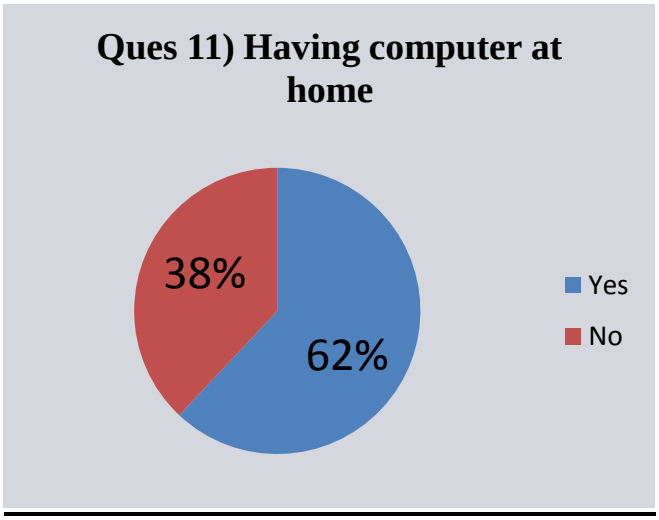


Most of the students not boring using e-Book because it is provided with fun and encourage them to engage during learning as it has attractive features that boost their creativity and learning autonomy.

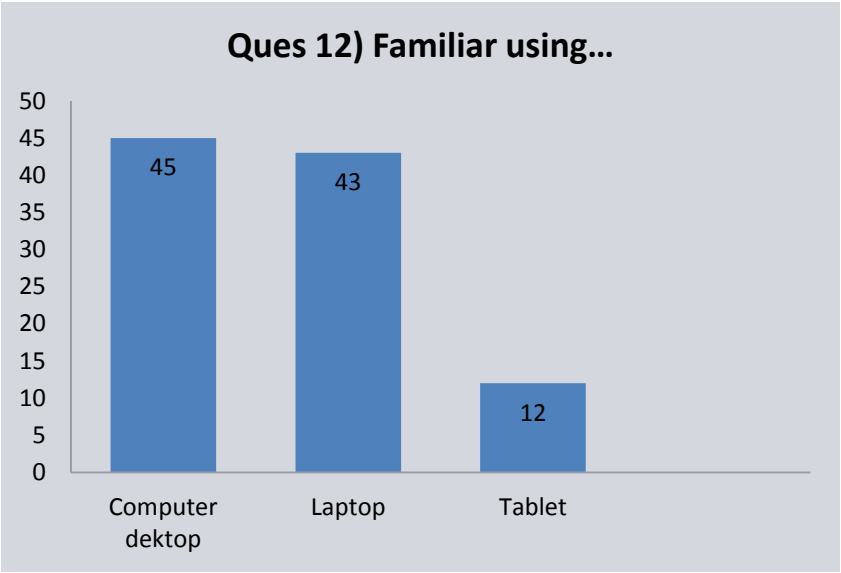


Due to IT literacy some of the students (9%) having problem using e-Book in learning process. Teachers and educators should be adequately trained to conduct lessons with e-books and to be able to help the students.





Most of students have computer at home. Thus they are already familiar in operating a computer.



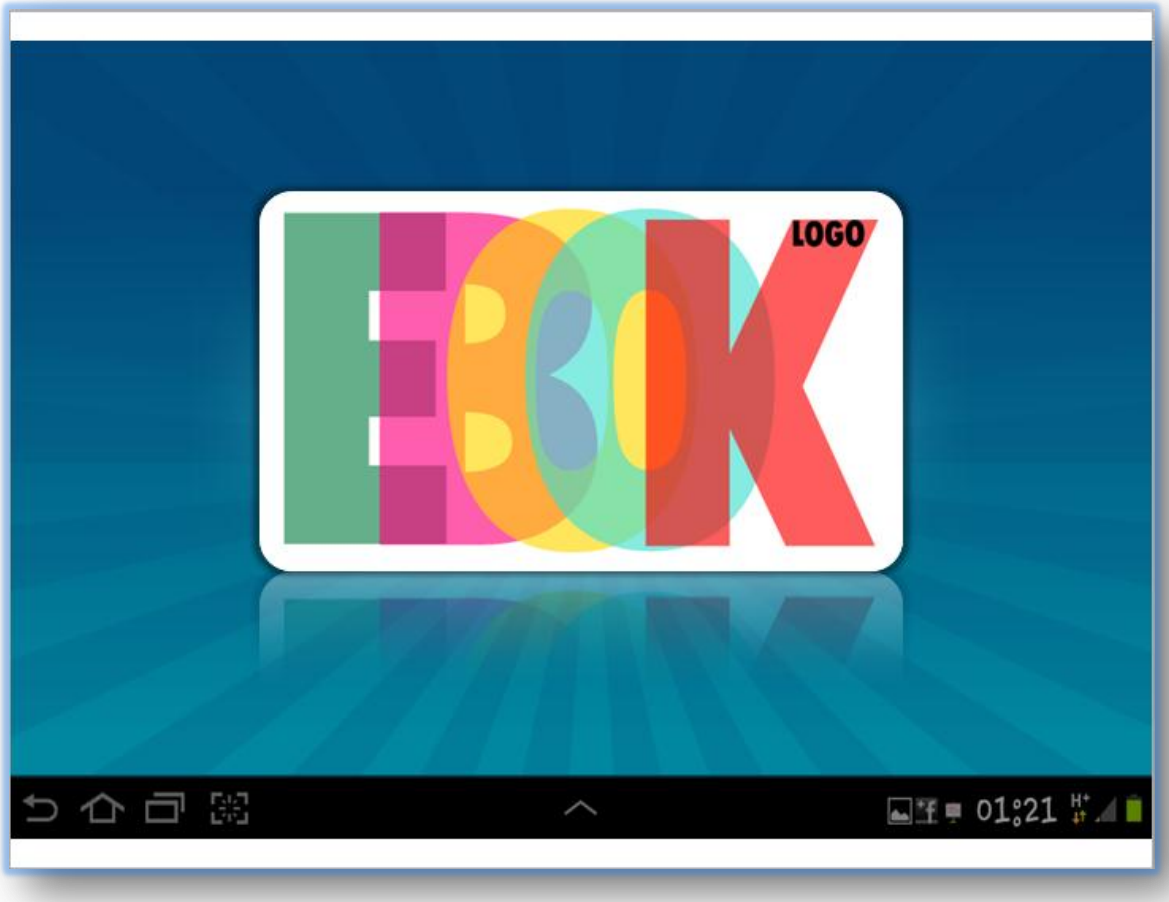
Percentage shows that most of students already familiar with desktop computer and also laptop. But only 12% who are familiar using tablet.

4.1.1Qualitative Interview

It is important to gain information about the e-Book from someone who already familiar with it. Qualitative interview has been conducted successfully with one of the first batch of Terengganu student receive the e-Book from government of Terengganu, Muhammad Faiz bin Kamaruddin. He is now 13 years old and after finish Year 6, he continues his secondary school in Melaka. A set of interview questionnaires has been issued to Muhammad Faiz. The questionnaires aim to help developer understand more deeply on how e-Book being used in classroom and the general issue related to usage, emotions, lifespan and assistance towards using e-Book. The result of these studies will be analyzed and few solutions will be suggested to be channeled using Android application which will help in producing more excellence e-Book.

4.2 User Interface Design

The main finding of this research is Science e-Book that is anticipated to assist in individual learning styles. The e-Book created can be used by students and teachers in the process of teaching and learning of Science subjects. The students can use the e-Book based on their learning pace, according to their preferred learning styles. For examples, figure. 2, 3 and 4 show the interfaces of e-Book.



This is the landing page for the e-Book. In the landing page, there's no available button for user to click. It will be the intermediary page for user while waiting for the apps to load.

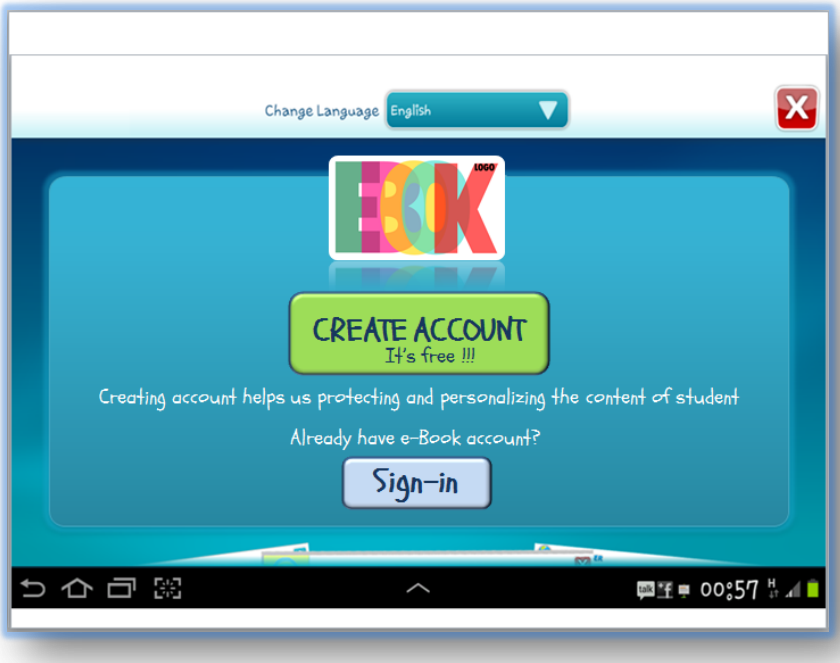
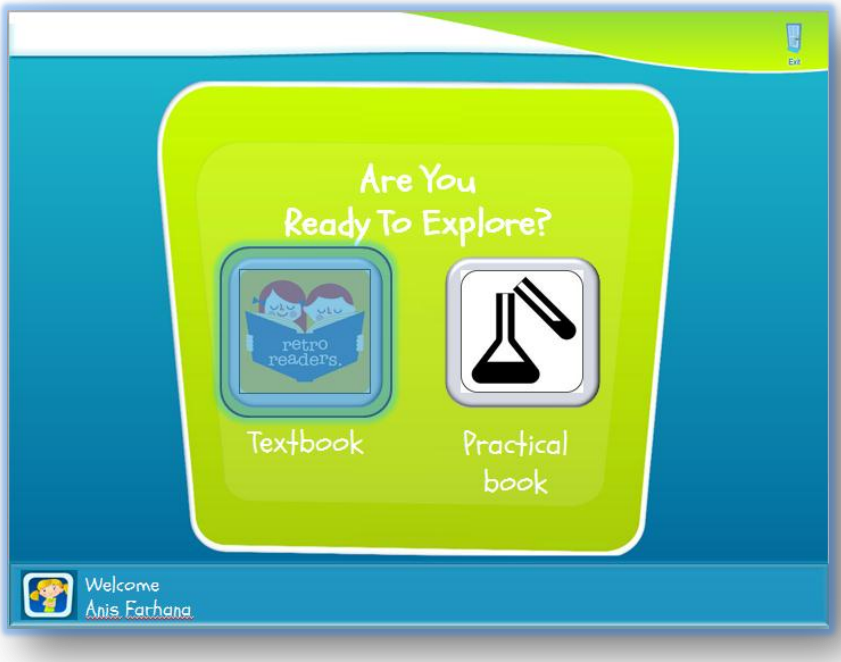


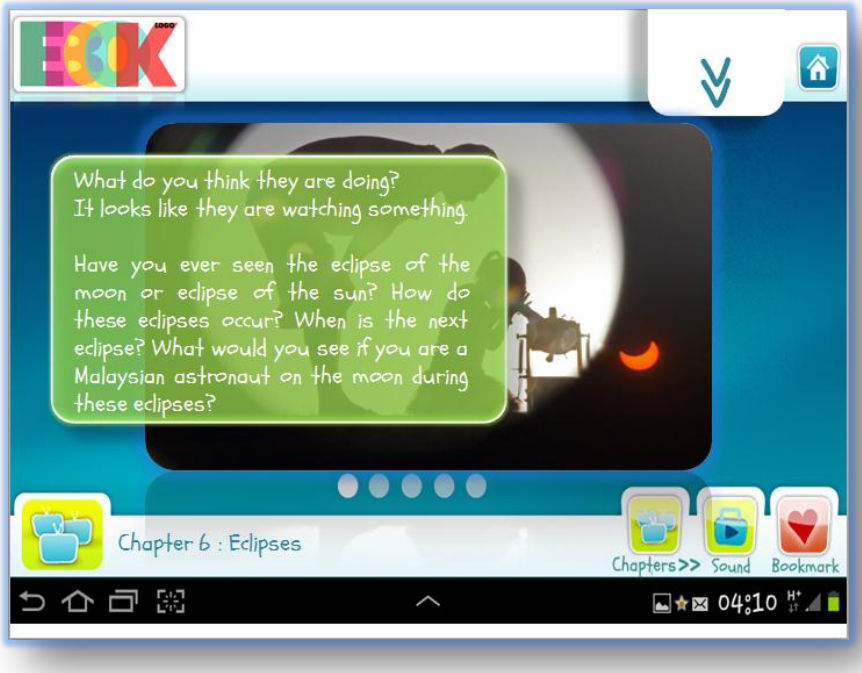
Figure shows the login page. For the first time user, they need to register by clicking the "Create Account" button then it will lead user to registration form. By creating account, the system is able to store all the activities done by each user. So, when they login back into the apps, they still can continue previous work they have done.



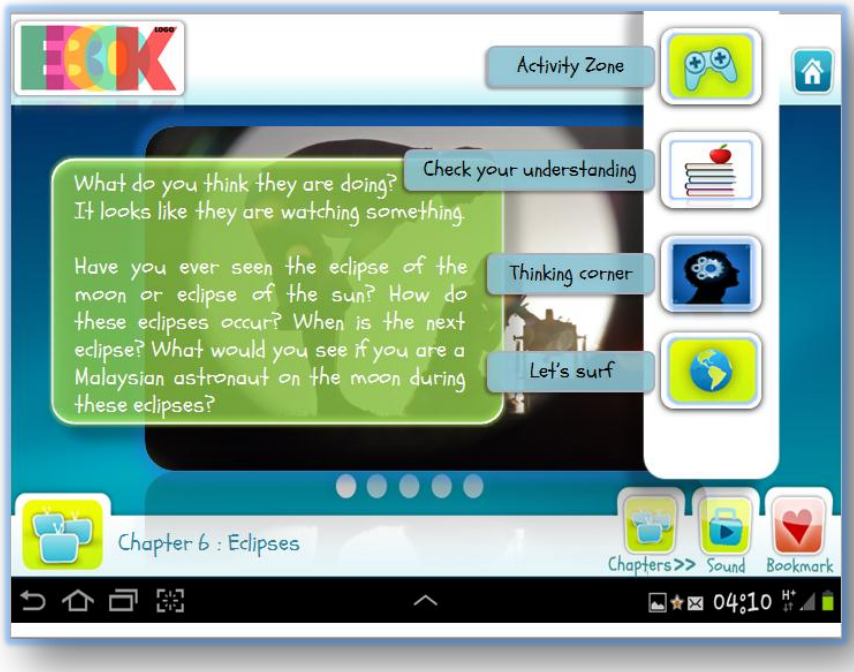
This is menu part. There will be two options available for user, 1. Textbook and 2. Practical Book.

Once user click “Textbook”, the system will show all the chapters in Science textbook.

Interface show the lesson available in chapter 6.



Introduction page for chapter 6



For every lesson there will be four options for user:

i. Activity Zone – user will be provided with fun and exciting activity to be done. User will enhance their creativity from what they have learnt throughout the lesson. They will apply all the theories learnt in the activity.
ii. Check your understanding – There will be exercises, subjective and objectives questions for user to test their understanding.
iii. Thinking corner – Once user click on this button, they will enjoy fun facts and interesting information that will enhance their knowledge in the subject discuss in the chap.
iv. Let's surf – provide user with interesting videos regarding the lessons available on the internet

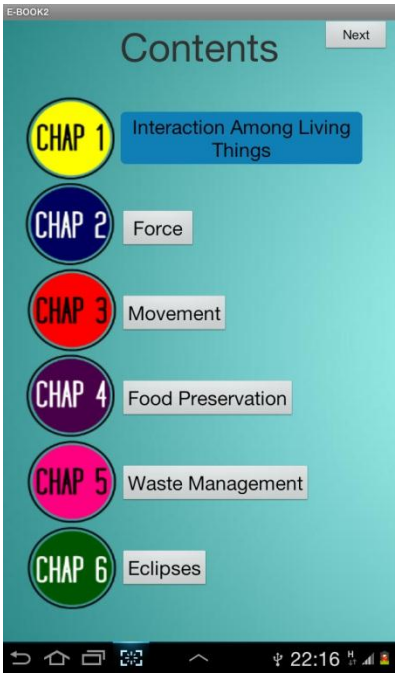
If user successfully completed each activity in the four options available within time given, they will be given points. If user reaches the maximum values of points, they will be rewarded with awards. The system also will notify the user to re-do the activity if they get marks below than target.

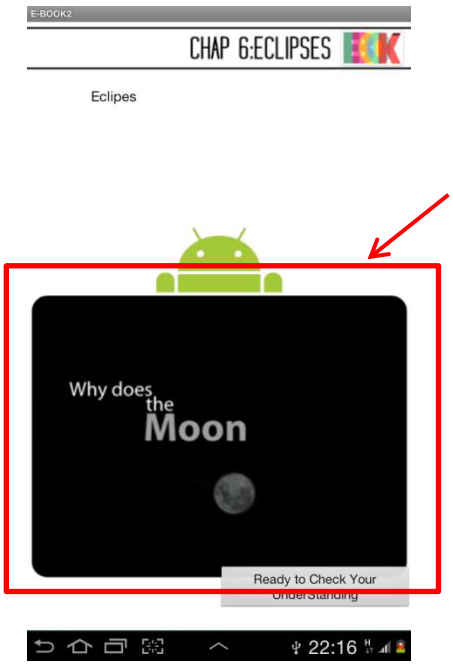
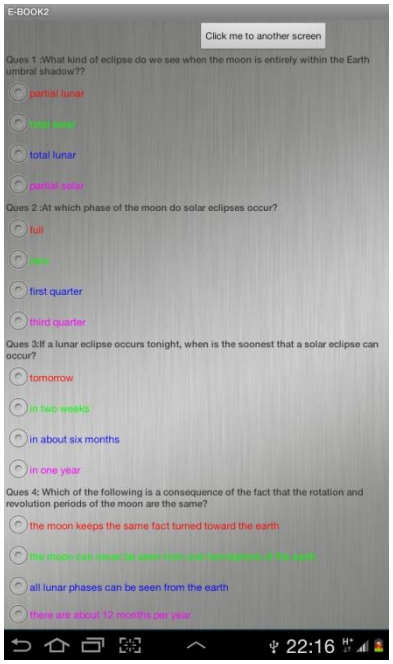
4.3 Prototype Overview

There will be two version of prototype. Second prototype is the enhancement of the version I. After user-testing (phase I) being done, user more prefer on horizontal layout rather than vertical layout because vertical layout looks more crowded, can get weighty and hard to navigate in a hurry. User also found that version II (horizontal layout) is more user-friendly:

- Most of the screens are much wider than vertical which is tall. All the info also can be embedded nicely on the screen at a higher resolution. To get a vertical page all the screens the font size has to be very small, thus hard to read.
- The entire screen was used for the page in horizontal layout and the entire page fit on the screen.
- The two column format made it easy to read. There were no long lines going across the width of the screen

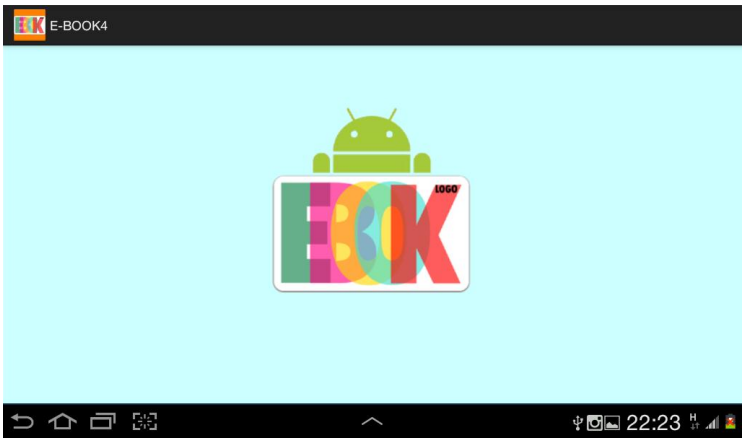
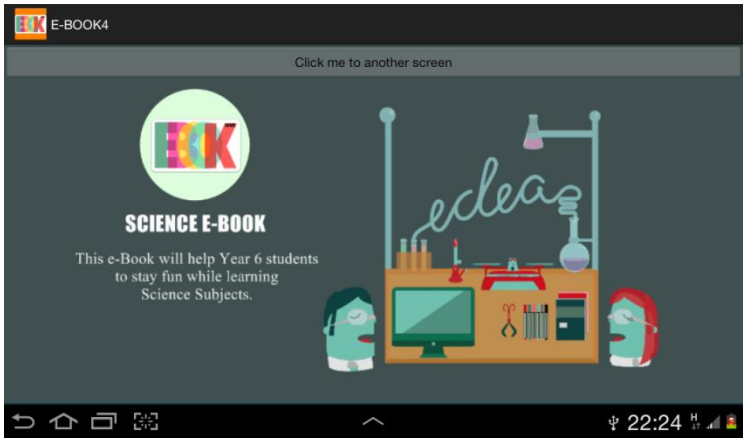
4.3.1 Version I

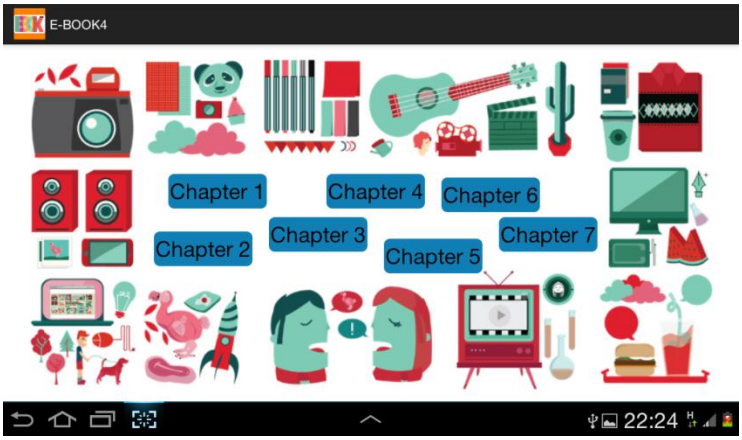
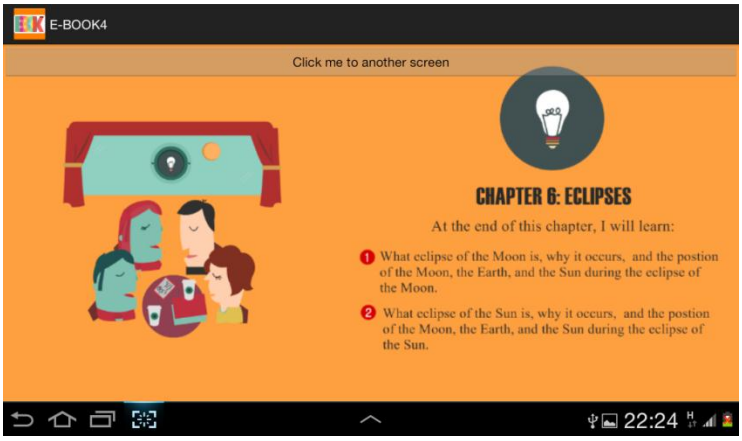
Interface	Description
	This will be the first splash screen appear once user click the e-Book button.
	Next, the menu button will appear which enable user chooses which chapter they want to learn. (For this e-Book, only chapter 6 available)

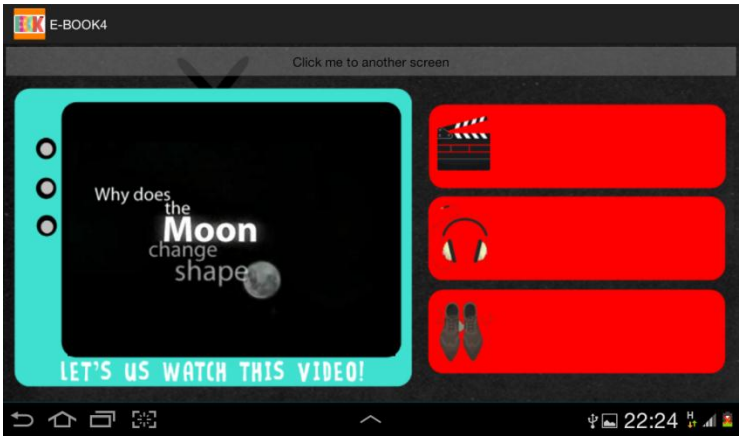
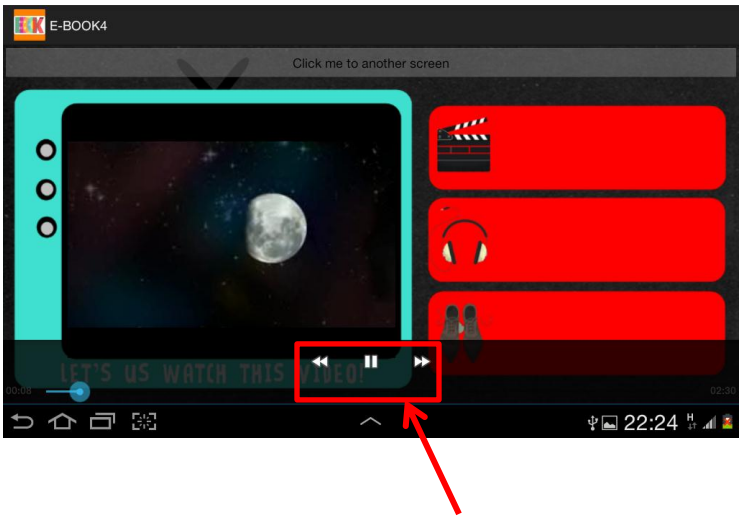
Interface	Description
	There will be simple notes about the chapter here. Arrow shows a video available to help understanding.
	Next screen will be exercise part. Mcq questions

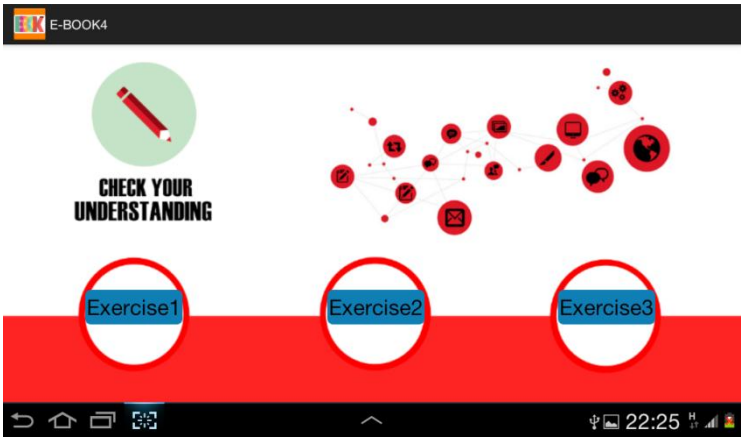
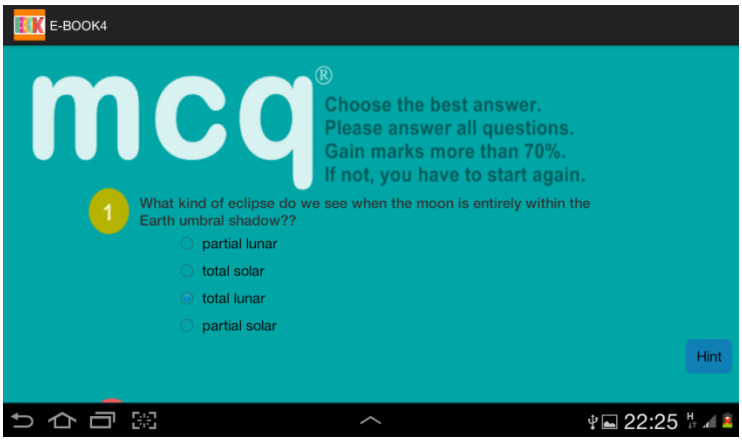
Interface	Description
	Drag and drop exercise.

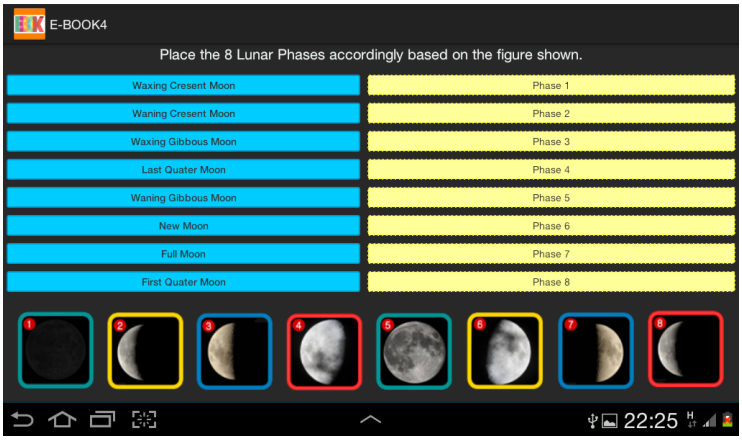
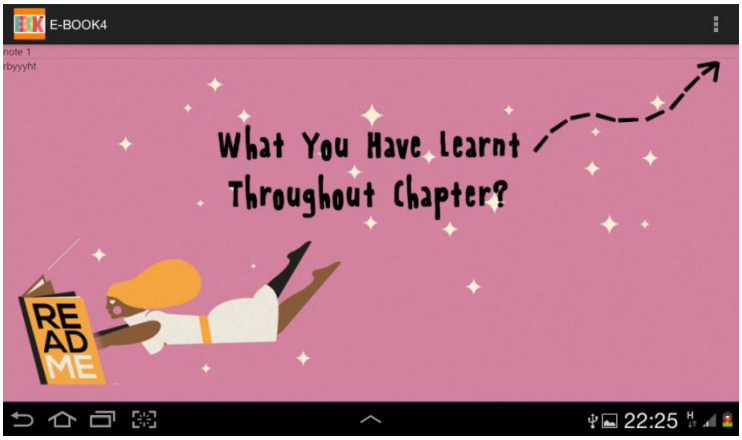
4.3.1 Version II

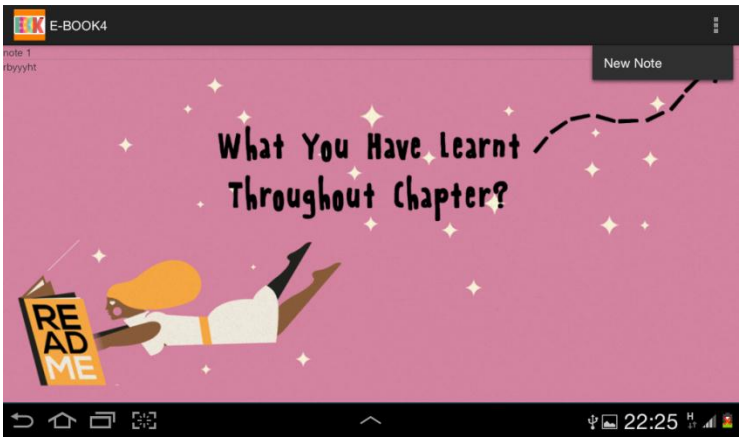
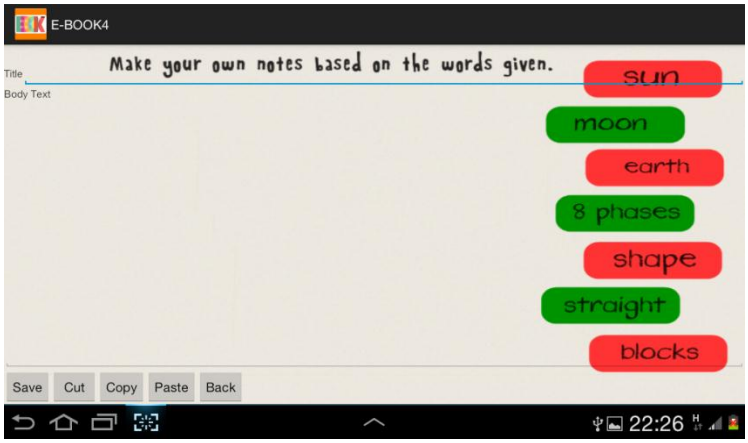
Interface	Description
	This will be the first splash screen appear once user click the e-Book button.
	First landing page of the e-Book

Interface	Description
	Next, the menu button will appear which enable user chooses which chapter they want to learn. (For this e-Book, only chapter 6 available)
	Landing page for the Chapter 6: Eclipes.

Interface	Description
	There will be simple notes about the chapter here. Arrow shows a video available to help understanding.
	Button pause, forward and backward available for the video.

Interface	Description
	Three exercises available for the user
	Exercise 1 : Mcq Question

Interface	Description
	Exercise 2: Drag and drop
	Exercise 3: Simple essay

Interface	Description
	User has to click on the upright dot button then "New Note" button will pop out.
	Once user click on the "New Note" button, this screen will appear which enable user to type on the simple essay based on the keywords given.

CONCLUSION

As a conclusion, as technology of mobile-learning has developed, the use of e-Book in early childhood classrooms seems to be a growing trend which is very attractive, fun and mobile. Therefore, Science e-Book is proposed to be part of learning tools for year 6 students to help their understanding in Science and maintain their interest to learn by providing sounds and animation. Besides providing fun element, the student is motivated to learn more about Science through the given exercises, and if they get lower marks they have to redo it before they can move on to the next level.

There are 3 main objectives that need to be achieved throughout the project. In objective 1, the author wants to survey the effectiveness of existing e-Books in Malaysia for Year 6 students in primary school. This had been achieved through the questionnaire survey done for Terengganu's students who were already familiar with the e-Book usage. In objective 2, to design a system with interface based on a topic in Science subject which can satisfy students' needs and requirements. This also has been achieved through the design of the e-Book based on EBONI (Electronic Books ON-screen Interface) which describe how e-learning content can be made usable for year 6 students. Meanwhile in objective 3, to develop an interactive-digital-learning aid based on a Science topic student in order to promote a more exciting and memorable learning experience. This had been achieved through the development of the e-Book on the Chapter 6, together with the notes and different kinds of exercise.

Through the feedbacks gathered, several recommendations have been found to be useful for further improvement in e-Book. It is recommended that the all the chapters content will be made available and the e-Book will generate more appropriate marking notification system in order to help teachers to monitor each and every the performance of students while using the e-Book.

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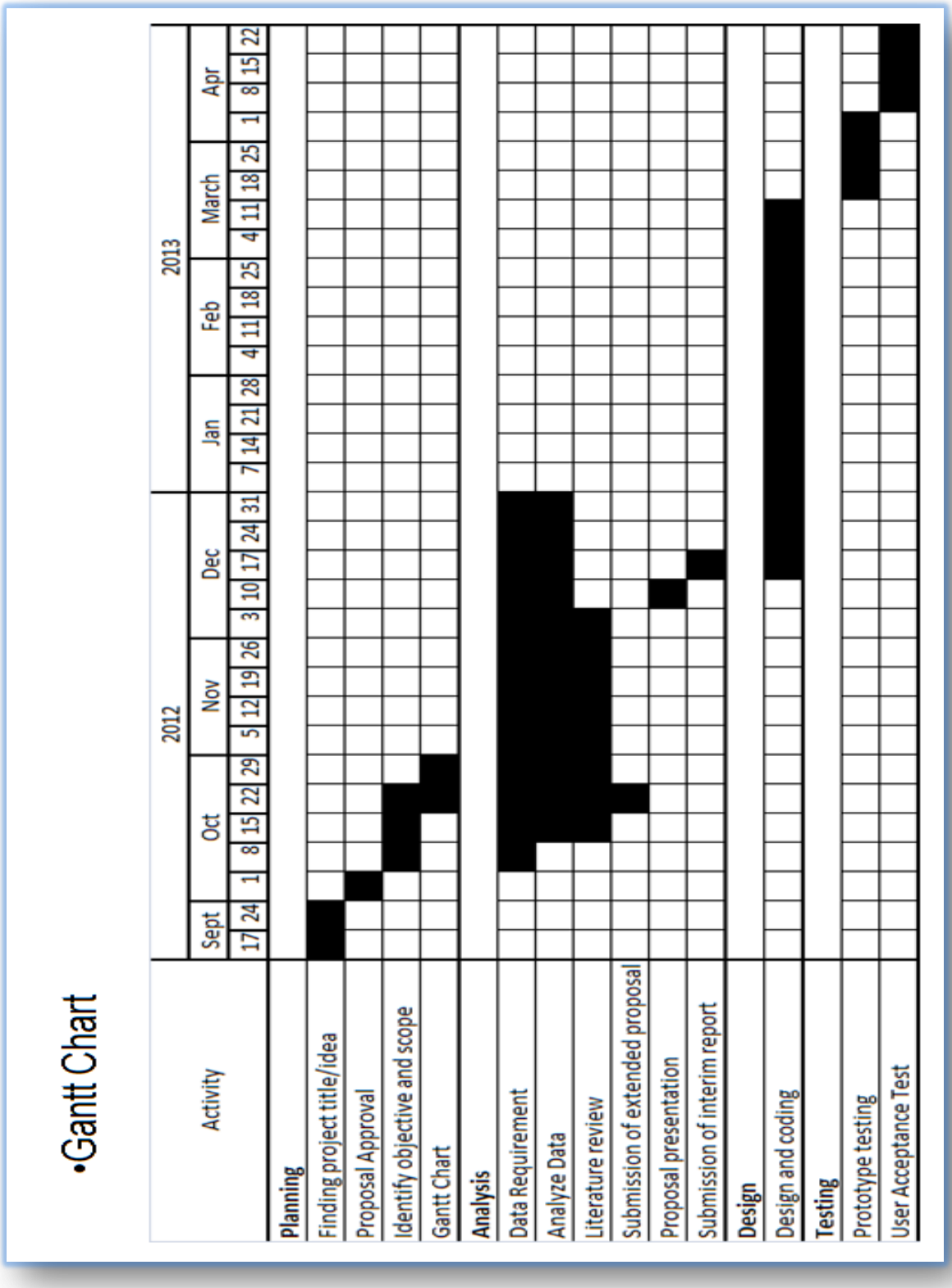
APPENDIX


•Gantt Chart
Activity
2012
2013
Sept
Oct
Nov
Dec
Jan
Feb
March
Apr
17 24 1 8 15 22 29 5 12 19 26 3 10 17 24 31 7 14 21 28 4 11 18 25 4 11 18 25 1 8 15 22
Planning
Finding project title/idea
Proposal Approval
Identify objective and scope
Gantt Chart
Analysis
Data Requirement
Analyze Data
Literature review
Submission of extended proposal
Proposal presentation
Submission of interim report
Design
Design and coding
Testing
Prototype testing
User Acceptance Test